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10/007,298	11/08/2001	Srikant Jayaraman	PA010495	5335

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EXAMINER
LE, LANA N

ART UNIT	PAPER NUMBER
2685	6

DATE MAILED: 11/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/007,298	JAYARAMAN ET AL.	
	Examiner	Art Unit	
	Lana Le	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 8,14, 20-23, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Mansouri et al (US 5,715,282).

Regarding claim 1, Mansouri et al discloses a method for mitigating adjacent channel interference (ACI) in a wireless communication system, comprising:

determining a presence or absence of ACI via 224 in each of one or more frequency ranges in a pre-processed signal comprised of a desired signal component (col 3, lines 24-38);

selecting a particular filter response at 226 from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62); and

filtering the pre-processed signal with the selected filter response (col 2, lines 57-62).

Regarding claim 2, Mansouri et al further discloses the method of claim 1, wherein Meyer et al didn't further disclose the presence or absence of ACI in the pre-processed signal is determined by filtering the pre-processed signal with a

respective ACI detection filter in 224 for each of the one or more frequency ranges, and determining the presence or absence of ACI in each frequency range based on a filtered signal from the respective ACI detection filter.

Regarding claim 4, Mansouri et al further discloses the method of claim 2, wherein each ACI detection filter 224 is implemented as a bandpass filter (col 3, lines 34-46).

Regarding claim 8, Mansouri et al further discloses the method of claim 1, wherein the presence or absence of ACI in the pre-processed signal is determined via signaling 218.

Regarding claim 14, Mansouri further discloses the method of claim 1, wherein the plurality of possible filter responses include a fourth filter response selected for use if ACI is determined to be absent from the pre-processed signal (col 2, lines 57-62).

Regarding claim 20, Mansouri et al discloses a digital signal processor 340 of fig. 1 comprising:

an adjacent channel interference (ACI) detector 224 configured to determine a presence or absence of ACI in each of one or more frequency ranges in a pre-processed signal comprised of a desired signal component (col 3, lines 24-38); and

a selectable filter 226 configured to filter the pre-processed signal with a particular filter response selected from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62).

Regarding claim 21, Mansouri et al discloses a receiver processing apparatus 340 of fig. 1 comprising:

means 224 for determining a presence or absence of adjacent channel interference (ACI) via detection unit 224 in each of one or more frequency ranges in a pre-processed signal comprised of a desired signal component (col 3, lines 24-38); and

means 226 for filtering the pre-processed signal with a particular filter response selected from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62).

Regarding claim 22, Mansouri et al discloses a receiver unit 100 (fig. 1) in a wireless communication system, comprising:

a front-end unit 112, 210, 124 configured to pre-process a received signal comprised of a desired signal component;

an adjacent channel interference (ACI) detector 224 configured to determine a presence or absence of ACI in the pre-processed signal in each of one or more frequency ranges (col 3, lines 24-38); and

a selectable filter 226 configured to filter the pre-processed signal with a particular filter response selected from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62).

Regarding claim 23, Mansouri et al the receiver unit of claim 22, wherein the ACI detector includes one or more ACI detection filters 224 configured to filter the pre-processed signal for the one or more frequency ranges (col 3, lines 24-33).

Regarding claim 29, Mansouri et al discloses a receiver apparatus 100 (fig. 1) in a wireless communication system, comprising:

means for pre-processing a received signal comprised of a desired signal component (col 2, lines 28-53);

means 224 for determining a presence or absence of adjacent channel interference (ACI) in the pre-processed signal in each of one or more frequency ranges (col 3, lines 24-38); and

means 226 for filtering the pre-processed signal with a particular filter response selected from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansouri et al (US 5,715,282) in view of Lazar (US 5,818,389).

Regarding claim 5, Mansouri et al further discloses the method of claim 2, wherein Mansouri et al didn't further specifically disclose each ACI detection filter has a response approximately matched to a spectral profile of the ACI in the frequency range being detected. Lazar further discloses each ACI detection filter has a response approximately matched to a spectral profile of the ACI in the frequency range being detected (col 3, lines 51-65; col 5, lines 30-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the detection filter's response of Mansouri matched to a spectral profile in order to detect if the interference exist by determining the location of the source of interference.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansouri et al (US 5,715,282) in view of Jones et al (US 3,623,098).

Regarding claim 15, Mansouri et al further discloses the method of claim 1, wherein further each of the plurality of possible filter responses is derived to respond to the interference (col 2, lines 57-62) based on a respective hypothesis for the ACI in the pre-processed signal sent via 218 detection of ACI determined in the detection and filter decision algorithm 224 (col 4, lines 5-37). Mansouri didn't specifically disclose each of the plurality of possible filter responses is derived to maximize signal to noise and interference ratio (SINR) (col 1, lines 23-36) based on a respective hypothesis for interference. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to maximize SINR to remove noise and interference to improve the system's efficiency.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansouri et al (US 5,715,282) in view of Jones et al (US 3,623,098) and further in view of Lazar (US 5,818,389).

Regarding claim 16, Mansouri et al and Jones et al further the method of claim 15, wherein Mansouri didn't specifically disclose each hypothesis is indicative of a hypothesized location and spectral profile for the ACI in the pre-processed signal. Lazar further disclose each hypothesis is indicative of a hypothesized location and spectral profile for the ACI in the pre-processed signal (col 3, lines 51-65; col 5, lines 30-36). However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the filter detection and decision algorithm of Mansouri et al to have a hypothesis that is indicative of a hypothesized location and spectral profile for the ACI in the pre-processed signal in order to detect if interference exists or not by determining the geographic source of interference.

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansouri et al (US 5,715,282).

Regarding claim 28, Mansouri discloses the receiver unit of claim 22 wherein Mansouri et al didn't further disclose the base station comprising the receiver unit of claim 22. It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the receiver of Mansouri in a base station in order to control and eliminate interference signals sent from mobile units or from another base station.

8. Claims 3, 6, 7, 9-13, 17-19, 24-26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mansouri et al (US 5,715,282) in view of Meyer et al (WO 00/72454).

Regarding claim 3, Mansouri et al further discloses the method of claim 2, wherein Mansouri didn't further disclose the presence or absence of ACI in the pre-processed signal is further determined by estimating an energy of the filtered signal from each ACI detection filter, and comparing the estimated energy for each ACI detection filter against a respective threshold, wherein the presence or absence of ACI in each frequency range is determined based on a result of the comparison.
Meyer et al further discloses the presence or absence of ACI in the pre-processed signal is further determined by estimating an energy of the filtered signal from each ACI detection filter, and comparing the estimated energy for each ACI detection filter against a respective threshold, wherein the presence or absence of ACI in each frequency range is determined based on a result of the comparison (page 10, line 6 - page 11, line 1; page 7, lines 16-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to estimate and compare an energy level instead of estimating the data training sequence of bits of Mansouri et al in order to measure the signal strength of the detected signal to determine if interference exists and to filter out the interference.

Regarding claim 6, Mansouri et al further discloses the method of claim 2, wherein Mansouri didn't further disclose the pre-processed signal is filtered with two ACI detection filters for ACI at an upper band-edge and a lower band-edge of the desired

signal component. Meyer et al further discloses the pre-processed signal is filtered with two ACI detection filters for ACI at an upper band-edge and a lower band-edge of the desired signal component (page 7, lines 13-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have two ACI detection filters at both an upper band-edge and a lower band-edge of the desired signal component in order to detect and eliminate interference from both sides of the spectrum.

Regarding claim 7, Meyer et al further discloses the method of claim 6, wherein each ACI detection filter has a response that overlaps a respective band-edge of the desired signal component (fig. 3).

Regarding claim 9, Mansouri et al further discloses the method of claim 1, wherein Mansouri didn't specifically discloses the plurality of possible filter responses are provided by a plurality of sets of filter coefficients by providing respective a set of filter coefficients for each respective response. Meyer et al further discloses the plurality of possible filter responses are provided by a plurality of sets of filter coefficients by providing respective a set of filter coefficients for each respective response (page 8, line 7 – page 9, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a set of filter coefficients in order to have each filter response have its distinction from another response.

Regarding claim 10, Mansouri et al further discloses the method of claim 9, wherein Mansouri et al didn't further disclose the plurality of sets of filter coefficients are

for a finite impulse response (FIR) filter. Meyer et al discloses wherein the plurality of sets of filter coefficients are for a finite impulse response (FIR) filter (page 8, line 7 – page 9, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a FIR filter in order to filter a predefined range of interference only on the side of the spectrum with the larger interference energy.

Regarding claim 11, Mansouri et al further discloses the method of claim 1, wherein Mansouri et al didn't further disclose the plurality of possible filter responses include a first filter response selected for use if ACI is determined to be present at an upper band-edge of the desired signal component. Meyer et al further discloses the plurality of possible filter responses (col 4, lines 6-17) include a first filter response selected for use if ACI is determined to be present at an upper band-edge of the desired signal component (page 8, lines 5-12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to select one of the filter response such as FIR in order to filter a predefined range of interference only on the side of the spectrum with the higher interference.

Regarding claim 12, Mansouri further discloses the method of claim 1, wherein Mansouri didn't further disclose the plurality of possible filter responses include a second filter response selected for use if ACI is determined to be present at a lower band-edge of the desired signal component. Meyer et al further discloses the plurality of possible filter responses (col 4, lines 6-17) include a first filter response selected for use if ACI is determined to be present at a lower band-edge of the desired signal component (page 8, lines 5-12). It would have been obvious to one of ordinary skill in

the art at the time the invention was made to select one of the filter response such as FIR in order to filter a predefined range of interference only on the side of the spectrum with the higher interference.

Regarding claim 13, Mansouri et al further discloses the method of claim 1, wherein Mansouri didn't further disclose the plurality of possible filter responses include a third filter response selected for use if ACI is determined to be present at both an upper band-edge and a lower band-edge of the desired signal component. Meyer et al further discloses the plurality of possible filter responses include a third filter response selected for use if ACI is determined to be present at both an upper band-edge and a lower band-edge of the desired signal component (page 8, line 14-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to select a different response, i.e. IIR in order to be able to eliminate interference wherever it exists.

Regarding claim 17, Mansouri et al discloses a method for mitigating adjacent channel interference (ACI) in a CDMA system, comprising:

pre-processing a received signal comprised of a desired signal component;

filtering the pre-processed signal with a respective ACI detection filter for each of one or more frequency ranges (col 3, lines 24-33);

determining a presence or absence of ACI in each frequency range based on an estimated training sequence of bits of a filtered signal from the respective ACI detection filter 224 and a threshold (col 3, lines 24-33; col 3, line 59 - col 4, line 4);

selecting a particular filter response from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62);

and filtering the pre-processed signal with the selected filter response (col 2, lines 57-62).

However, Mansouri didn't further disclose determining a presence or absence of ACI in each frequency range based on an estimated energy; and wherein the plurality of possible filter responses are provided by a plurality of sets of filter coefficients for a finite impulse response (FIR) filter. Meyer et al discloses determining a presence or absence of ACI in each frequency range based on an estimated energy (page 7, lines 12-20; page 10, line 6 - page 11, line 1); and wherein the plurality of possible filter responses (col 4, lines 6-17) are provided by a plurality of sets of filter coefficients for a finite impulse response (FIR) filter (page 8, line 2 – page 9, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to estimate energy and provide filter coefficients for a FIR in order to measure the signal strength of the detected signal instead of by data bits to determine if interference exists and to filter out the interference and filter within a predefined range of interference only on the side of the spectrum with the larger interference energy.

Regarding claim 18, Mansouri et al discloses a method for detecting adjacent channel interference (ACI), comprising:

filtering a pre-processed signal, comprised of a desired signal component, with a respective ACI detection filter for each of one or more frequency ranges (col 3, lines 24-

46); estimating a training sequence of bits of a filtered signal from each ACI detection filter; comparing the estimated training sequence of bits for each ACI detection filter against a respective threshold; and providing an indication of a presence or absence of ACI in each frequency range based on a result of the comparison (col 3, line 64 – col 4, line 4). However, Mansouri et al didn't further disclose: estimating an energy of a filtered signal from each ACI detection filter; comparing the estimated energy for each ACI detection filter against a respective threshold; and providing an indication of a presence or absence of ACI in each frequency range based on a result of the comparison. Meyer et al further discloses: estimating an energy of a detected filtered signal; comparing the estimated energy against a respective threshold; and providing an indication of a presence or absence of ACI in each frequency range based on a result of the comparison (page 10, line 6 - page 11, line 1; page 7, lines 12-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to estimate energy instead of the data bits in order to measure the signal strength of the detected signal to determine if interference exists.

Regarding claim 19, Mansouri et al discloses a memory with stored data (col 3, lines 64 –col 4, line 4) communicatively coupled to a digital signal processing device (DSPD) 340 of fig. 1 capable of interpreting digital information to:

filter a pre-processed signal, comprised of a desired signal component, with a respective adjacent channel interference (ACI) detection filter 340 of fig. 2 for each of one or more frequency ranges (col 3, lines 24-46);

determine a presence or absence of ACI in each frequency range based on an estimated training sequence of bits of a filtered signal from the respective ACI detection filter and a threshold (col 3, line 59 – col 4, line 22); and

filter the pre-processed signal with a particular filter response selected from among a plurality of possible filter responses based on the determined presence or absence of ACI in each of the one or more frequency ranges (col 2, lines 57-62). Mansouri didn't further disclose determining a presence or absence of ACI in each frequency range based on an estimated energy of a filtered signal and a threshold. Meyer et al further discloses determining a presence or absence of ACI in each frequency range based on an estimated energy of a detected filtered signal and a threshold (page 10, line 6 - page 11, line 1; page 7, lines 12-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to estimate energy instead of the data bits in order to measure the signal strength of the detected signal to determine if interference exists.

Regarding claim 24, Mansouri et al the receiver unit of claim 23, wherein Mansouri et al further disclose the ACI detector 224 is configured to determine the presence or absence of ACI in each frequency range based on an estimated training sequence of bits of a filtered signal from the respective ACI detection filter and a threshold (col 3, line 64 – col 4, line 4). Mansouri et al didn't further disclose determining a presence or absence of ACI in each frequency range based on an estimated energy of a detected filtered signal and a threshold. Meyer et al further discloses determining a presence or absence of ACI in each frequency range based on

an estimated energy of a detected filtered signal and a threshold (page 10, line 6 - page 11, line 1; page 7, lines 12-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to estimate energy instead of the data bits in order to measure the signal strength of the detected signal to determine if interference exists.

Regarding claim 25, Mansouri et al discloses the receiver unit of claim 22, wherein Mansouri et al didn't further disclose the selectable filter is implemented as a finite impulse response (FIR) filter, and wherein the plurality of possible filter responses are provided by a plurality of sets of filter coefficients. Meyer et al further discloses the selectable filter is implemented as a finite impulse response (FIR) filter, and wherein the plurality of possible filter responses are provided by a plurality of sets of filter coefficients (page 8, line 7 – page 9, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a FIR filter response in order to filter a predefined range of interference only on the side of the spectrum with the larger interference energy.

Regarding claim 26, Mansouri et al discloses the receiver unit of claim 22, wherein Mansouri didn't further disclose the plurality of possible filter responses are provided by a plurality of sets of filter coefficients by providing a set of filter coefficients for each respective response. Meyer et al further discloses the plurality of possible filter responses are provided by a plurality of sets of filter coefficients by providing a set of filter coefficients for each respective response (page 8, line 7 – page 9, line 1). It would have been obvious to one of ordinary skill in the art at the time the invention was

made to have a set of filter coefficients in order to have each filter response have its distinction from another response.

Regarding claim 27, Mansouri et al disclose the receiver unit of claim 22 wherein Mansouri et al didn't further disclose a terminal comprising the receiver unit of claim 22. Meyer et al discloses a terminal comprising the receiver unit of claim 22 (fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the receiver in a terminal in order to detect interference from signals sent to a device containing the receiving unit.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana Le whose telephone number is (703) 308-5836. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Lana Le

October 22, 2003

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